NOTES ON THE STATUS OF SOME *ELODINA* C. & R. FELDER SPECIES (LEPIDOPTERA: PIERIDAE)

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Abstract

The status of *Elodina tongura* Tindale, *E. queenslandica* De Baar & Hancock, *E. q. kuranda* De Baar & Hancock, *E. walkeri* Butler, *E. umbratica* Grose-Smith, *E. sada* Fruhstorfer, *E. hypatia hypatia* C. & R. Felder and *E. egnatia* (Godart) is discussed. Twenty-six species and ten subspecies of *Elodina* C. & R. Felder are recognised.

Introduction

The genus *Elodina* C. & R. Felder, 1865, contains a variable number of recognised species (16 according to Parsons 1998, 23 according to Yata 1985), of *Capparis* (Capparaceae) feeding butterflies. Continuing uncertainty as to the status of certain Australian and New Guinea taxa has prompted a critical review of Braby (2000), De Baar and Hancock (1993a), Parsons (1998) and Yata (1985), together with a reinterpretation of the status of a few other taxa. The 26 species and 10 subspecies recognised as a result of this review, together with their general distributions, are listed in Table 1.

Discussion

Elodina tongura

E. tongura Tindale was regarded as a valid species by De Baar and Hancock (1993a). Braby (2000) considered it to be 'a wet season form of *E. walkeri*' and ignored the much longer vesica of the male genitalia compared with that of *E. walkeri* Butler. Hancock (2001) noted (in a review of Braby 2000) that '*Elodina tongura* has been placed as a seasonal form of *E. walkeri*, despite differences in the aedeagus and its restriction to coastal and insular Northern Territory; [but] a seasonal form would be expected to occur throughout the range of the species, including Queensland.' Hancock (2001) also noted that 'many pierid genera contain cryptic species that are difficult to tell apart.'

Parsons (1998: p. 289) stated 'It also appears that the taxon *tongura* Tindale ... might belong to *definita*.' *E. definita* Joicey & Talbot is known from across New Guinea but, unlike *E. tongura*, it has a well defined subapical band on the underside of the forewing.

Recently, a small series of *Elodina* was collected north of Woolner Station, 60 km east of Darwin, Northern Territory, flying among thorny branches of a *Capparis* tree near the sea, behind coastal marshlands (D.P.A. Sands, pers. comm.). Specimens from this series were examined by both the present author and D.L. Hancock (pers. comm.), who considered it to contain both *E. tongura* and *E. walkeri* (Sands and New 2002). This collection thus demonstrates a distributional overlap between *E. walkeri* and *E. tongura*.

Table 1. *Elodina* species and subspecies and their general distributions.

Elodina taxa	Distribution
E. leefmansi Kalis, 1934	eastern Java
E. pura Grose-Smith, 1895	Pura, Alor, Adonara, Pantar & Flores (Lesser Sunda Is)
E. sota Eliot, 1956	southern Sulawesi
E. dispar Rober, 1887	Banggai Archipelago (E of Sulawesi)
E. egnatia egnatia (Godart, 1819)	Ambon, Seram (southern Moluccas)
E. e. bouruensis Wallace, 1867	Buru (southern Moluccas)
E. e. cirrha (Boisduval, 1832)	Halmahera (northern Moluccas)
E. e. boisduvali Fruhstorfer, 1911	northern Sulawesi
E. e. fruhstorferi Rober, 1919	Timor, Sumba (Lesser Sunda Is)
E. e. tenimberensis Joicey & Talbot, 1922	Tanimbar (eastern Lesser Sunda Is)
E. invisibilis Fruhstorfer, 1910	Wetar (Lesser Sunda Is)
E. therasia C. & R. Felder, 1865	Halmahera (northern Moluccas)
E. anticyra Fruhstorfer, 1910	Numfoor & Roon Is, (Geelvink Bay, West Papua)
E. hypatia hypatia C. & R. Felder, 1865	New Guinea & surrounding islands
E. h. litana Fruhstorfer, 1910	Kei Is
E. biaka Joicey & Noakes, 1915	Biak I., northern West Papua
E. aruensis Joicey & Talbot, 1922	Aru Is
E. definita Joicey & Talbot, 1916	New Guinea
E. andropis andropis Butler, 1876	Central Province, Papua New Guinea
E. a. namatia Fruhstorfer, 1910	Waigeo I. & northern West Papua
E. a. hydatis Fruhstorfer, 1910 [= *Elodinesthes effeminata* Fruhstorfer]	Morobe Province & D'Entrecasteaux group, Papua New Guinea
E. umbratica Grose-Smith, 1889	Choiseul to San Cristobal & Santa Ana, Solomon Islands
E. sada Fruhstorfer, 1910	Waigeo I. & New Guinea
E. primularis Butler, 1882	New Britain, Duke of York I. & New Ireland (Bismarck Archipelago)
E. argypheus Grose-Smith & Kirby, 1890	Bougainville, Choiseul, Santa Isabel, Guadalcanal (Solomon Archipelago)
E. signata signata Wallace, 1867	New Caledonia
E. s. pseudanops Butler, 1877	Lifu (Loyalty Is)
E. parthia (Hewitson, 1853)	Cape York Peninsula, Queensland, to central eastern New South Wales
E. padusa (Hewitson, 1853)	Australia (except SW Western Australia & Tasmania)
E. walkeri Butler, 1898	far northern areas of Australia
E. tongura Tindale, 1923	coastal Northern Territory, Australia

Elodina taxa	Distribution
E. perdita Miskin, 1889	central eastern Queensland
E. claudia De Baar & Hancock, 1993	mid Cape York Peninsula, northern Queensland
E. angulipennis (P.H. Lucas, 1852)	central eastern Queensland to central eastern New South Wales
E. queenslandica queenslandica De Baar & Hancock, 1993	Cape York Peninsula, northern Queensland
E. q. kuranda De Baar & Hancock, 1993	NE to SE Queensland

On present evidence, based on male genitalia, the more distinct yellow basal flash of the forewing underside in *E. tongura* (subdued in *E. walkeri*), its usually larger size, its confinement to the northern coastal regions and islands of the Northern Territory (*E. walkeri* occurs across northern Australia), the absence of a dark patch on the underside of the forewing apical area (not so for *E. definita* Joicey & Talbot, which has a rather distinct patch or band), it is concluded that *E. tongura* should be retained as a distinct species.

Elodina queenslandica

E. queenslandica and its subspecies *E. q. kuranda* were described recently by De Baar and Hancock (1993a). Parsons (1998: p. 285) stated 'However, *queenslandica* is apparently merely a subspecies of the earlier described NG taxon *andropis*' and, in the *E. andropis* Butler section (p. 287), further stated 'It also appears that the taxon *queenslandica*, and particularly its subspecies *kuranda* ... might belong to *andropis*.' *E. andropis* is a distinctive species represented by three subspecies (*E. a. andropis, E. a. namatia* Fruhstorfer and *E. a. hydatis* Fruhstorfer), which always has a broad subapical/ subterminal band on the forewing underside, although in *E. a. namatia* this band is not as broad as in the other subspecies.

E. q. queenslandica and *E. q. kuranda* both have a uniformly white hindwing underside on black and white prints when photographed under ultraviolet light; however, *E. a. andropis* and *E. a. hydatis* have an intensely black thin marginal line (data from ultraviolet-reflection photographic studies undertaken for the review by De Baar and Hancock 1993a; *E. a. namatia* not studied). The hindwing upperside margins are broadly banded brown-black in both sexes of *E. a. andropis* and in males of *E. a. namatia* and sometimes there are brownish submarginal patches present in females of *E. a. hydatis*; these features are not present in *E. queenslandica*. The forewing underside subapical/ subterminal darker band is always broader in *E. a. andropis* and *E. a. hydatis* than in *E. queenslandica*. This is very noticeable in *E. q. queenslandica*, which occurs geographically closest to *E. andropis*. The forewing underside basal flash is yellow-orange in *E. q. queenslandica* but subdued in *E. q. kuranda, E. a. andropis* and *E. a. hydatis*.

Braby (2000) did not recognise subspecies in *E. queenslandica*, based on variations in the forewing underside subapical/ subterminal band. However, *E. q. queenslandica* consistently lacks projections on the upper forewing apical black area between veins CuA_1 and CuA_2. As noted above, the forewing underside basal flash is yellow-orange in *E. q. queenslandica*, even in many specimens examined from Iron Range, Cape York Peninsula, but this is subdued in *E. q. kuranda*, a feature Braby (2000) did not discuss. The taxonomic and distributional boundaries between these two taxa might need further investigation. Braby (2000) also stated that specimens from the Yeppoon-Rockhampton area 'have very distinct genitalia' but no details were provided. Both Braby (2000) and De Baar and Hancock (1993b) indicated a need for further life-history studies. Moss *et al.* (1996) stated 'it appears likely that habitat requirements between the two species [*E. angulipennis* (P.H. Lucas) and *E. queenslandica*] may differ, with *E. q. kuranda* preferring moister habitats.' It is concluded that further work is necessary before these subspecific taxa are casually sunk.

Elodina walkeri, *E. sada* and *E. umbratica*

E. walkeri Butler was regarded as a distinct species by De Baar and Hancock (1993a). Parsons (1998) amalgamated *E. umbratica* Grose-Smith [type locality Ulawa I. (Ulaua)] and *E.* [*hypatia*] *sada* Fruhstorfer [type locality Waigeo (Waigiu)] and, while he mentioned the presence of this taxon across New Guinea, he made no mention of any localities east of New Guinea other than Ulawa in the Solomon Islands. Parsons (1998: p. 288) further stated 'It also appears that the taxon *walkeri* Butler ... might belong to *umbratica*.' Certainly, *E. walkeri* and *E. umbratica* appear similar, but some caution is necessary. The forewing apex is well rounded in New Guinea examples [*E. sada*] but subtly pointed in *E. walkeri*; New Guinea examples also have a more convex forewing termen. Solomon Islands examples [typical *E. umbratica*] have more extensive black forewing areas than *E. walkeri*.

E. umbratica is widespread in the Solomon Islands (Tennent 2002) but the placing of it, *E. sada* and *E. walkeri* in synonymy needs further support. *E. walkeri* has priority over *E. sada* but, at least for the time being, all three taxa should be regarded as distinct.

Elodina hypatia hypatia

When black and white prints of a few specimens of *E. h. hypatia* C. & R. Felder photographed under ultraviolet light were examined, one male from Sambio, Morobe Province, Papua New Guinea, appeared quite distinct. On the upperside of the wings this specimen was white in colour, apart from the apical areas, whereas other specimens examined had blackened upper surfaces. However, under visible light this specimen appeared typical for *E. h. hypatia*, except perhaps for a sinuous dark subapical patch on the forewing underside. The possibility exists that two species are involved.

Elodina egnatia

E. egnatia (Godart) occurs in the Moluccas, Sulawesi and Timor region (see Table 1). Waterhouse and Lyell (1914) included *E. angulipennis* under *E. egnatia* because a series of larger specimens from Prince of Wales I., Torres Strait, Queensland, appeared to be nearer typical *E. egnatia* than those from the mainland. However, *E. angulipennis* was returned to species status by Talbot (1932-1935) and Common and Waterhouse (1972). There are some similarities within the group, which includes *E. egnatia, E. angulipennis* and *E. queenslandica,* but the females of *E. egnatia* have hindwings washed in a cream colour on their undersides (not so for *E. angulipennis* and *E. queenslandica*). The apex of the forewing in *E. egnatia* is more acute than in *E. queenslandica* and slightly so in *E. angulipennis.* There is a large distributional gap between *E. queenslandica* (to which Waterhouse and Lyell (1914) were referring above) in the Torres Strait and the nearest *E. egnatia* population (Timor, Ambon or Ceram). It would be interesting not only to compare these three taxa but also the six subspecies of *E. egnatia*, which are widely separated geographically, using molecular techniques. Such a study might extend the species list even further.

Conclusion

Our taxonomic understanding of *Elodina* is still incomplete but, as with any difficult and cryptic group, caution is needed before any taxa are arbitrarily sunk or synonymised. The use of molecular systematics, including DNA analysis, may be necessary to resolve the problems of the group and either support or alter the present arrangement. On present evidence, the arrangement presented in Table 1 appears the most sound.

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